UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,929	03/26/2004	Kentaro Nakamura	1081.1196	6769

21171 7590 05/17/2007

STAAS & HALSEY LLP
SUITE 700
1201 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
KIM, DAVID S	
ART UNIT	**PAPER NUMBER**
2613	

MAIL DATE	DELIVERY MODE
05/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/809,929	NAKAMURA ET AL.	
	Examiner	Art Unit	
	David S. Kim	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *7-17 and 22-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 18* is/are rejected.

7)☒ Claim(s) *19-21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election **without** traverse of **Species 1, Figs. 1A-1B**, in the reply filed on 02 April 2007 is acknowledged. Applicant lists the following claims as readable on elected Species 1: **claims 1-6, 9-10, 14-15, 18-21, 24-25, 27, and 29-30**. However, the following claims do not appear to correspond to Species 1, shown in Figs. 1A-1B:

Claims 9-10 include limitations that correspond to Fig. 8A: the coupler and the four demultiplexers with shifted central frequencies. Figs. 1A-1B do not include at least these limitations.

Claims 14-15 include limitations that correspond to Fig. 14A (shown in Fig. 15): the first signal light group of three first signal lights with transmission bandwidth F1 arrayed next to each other and the second signal light with transmission bandwidth F2 (F2 ≤ F) positioned at a position of frequency interval F (F = 3 x F1) from the central frequency of the first signal light positioned at the center of said first signal group, which are alternately arrayed. Figs. 1A-1B do not include at least these limitations.

Claim 24 includes limitations that correspond to Fig. 8B: the coupler and the four multiplexers with shifted central frequencies. Figs. 1A-1B do not include at least these limitations.

Claims 25 and 27 include limitations that correspond to Fig. 8B: the coupler and the four multiplexers with shifted central frequencies. Figs. 1A-1B do not include at least these limitations.

Claim 29 includes limitations that correspond to Fig. 14B (shown in Fig. 15): the first port for inputting a first signal light group where a plurality of sets of three first signal lights with transmission bandwidth F1, which are arrayed adjacent to each other with the frequency interval F1, are arrayed with the frequency interval 6 x F1, and filtering said first signal light group based on the transmission characteristics having the transmission band with the bandwidth 3 x F1, of which the center is the central frequency of the first signal light positioned at the center of each set of said first signal light group. Figs. 1A-1B do not include at least these limitations.

Claim 30 includes limitations that correspond to Fig. 12B: the first and second multiplexers and the coupler for multiplexing the signal lights from said first and second multiplexers, and outputting the same. Figs. 1A-1B do not include at least these limitations. Moreover, claim 30 is dependent on claim 28, which Applicant withdrew.

2. Accordingly, **claims 7-17 and 22-31** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions (Species 2-4), there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 02 April 2007. The present Office Action examines **claims 1-6 and 18-21** as readable on the elected Species 1.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. **Claims 4-6** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In particular, notice the following limitations introduced in claim 4:

"a first interleaver comprising a first port for ***inputting*** said wavelength division multiplexing signals and filtering and ***outputting*** said wavelength division multiplexing signals...;

a second interleaver comprising a third port for ***inputting*** the signal lights from said first port and filtering and ***outputting*** the signal lights from said first port...;

a third interleaver comprising a fifth port for ***inputting*** the signal lights from said second port and filtering and ***outputting*** the signal lights from said second port..." (emphasis Examiner's).

These limitations disclose a first port, a third port, and a fifth port, each port providing an inputting function ***and*** an outputting function for a respective interleaver. Claim 4 appears to correspond to Fig. 1A. However, none of the ports of Fig. 1A provides an inputting function ***and*** an outputting function. Rather, it appears that each port provides either an inputting function ***or*** an outputting function. Moreover, it is generally known that an interleaver port does not generally input ***and*** output the same signal lights. That is, an interleaver port generally operates to input signal lights ***or*** to output interleaved/filtered signals lights. Applicant's disclosure does not provide further technical support for enabling the interleaver ports of Fig. 1A to each provide an inputting function ***and*** an outputting function for a respective interleaver. Accordingly, these cited limitations are not enabled. As a remedy, Examiner respectfully suggests amending the claim language of these limitations so that each port provides either an inputting function ***or*** an outputting function.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. **Claims 1-3 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Qian et al. (U.S. Patent Application Publication No. US 2003/0035168 A1, hereinafter "Qian").

Regarding claim 1, Qian discloses:

A wavelength division multiplexing transmission system for transmitting wavelength division multiplexing signals, where signal lights with different signal bandwidths are wavelength division-multiplexed, comprising

at least one of a demultiplexing unit (e.g., 1456 in Fig. 14C) for demultiplexing said wavelength division multiplexing signals and a multiplexing unit (e.g., 1454) for multiplexing a plurality of signal lights that are input, wherein

said demultiplexing unit further comprises a plurality of output ports for outputting demultiplexed signal lights (e.g., 1458), and each output port has transmission characteristics to be set such that the bandwidth of the transmission band where light transmits and the bandwidth of the non-transmission band where light does not transmit are different (e.g., Fig. 10B), and

said multiplexing unit further comprises a plurality of input ports for inputting said plurality of signal lights (e.g., 1452), and filters and multiplexes the signal lights that are input from said plurality of input ports respectively based on the transmission characteristics of each input port (e.g., 1454).

Qian does not expressly disclose:

said transmission band of each output port of said demultiplexing unit is ***substantially the same*** as the signal band of the signal lights that are output from said output port out of said received wavelength division multiplexing signals, and

each of said input ports of said multiplexing unit has a transmission band which ***substantially matches*** with the signal band of the signal lights to be input to said input port.

However, it is common practice in the art to have the transmission band of a port be substantially the same as/substantially match the signal band of the signal passing through that port. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement this standard practice in the apparatus of Qian. One of ordinary skill in the art would have been motivated to do this since alternative practices would not generally result in the best utilization of frequency space and maximization of data throughput rate mentioned by Qian (paragraph [0045]). That is, if the transmission band is not substantially the same/does not

substantially match the signal band of the signal passing through that port, then one would generally expect one of two undesirable results. If the transmission band is substantially less than the signal band, then there would be loss of bandwidth of the signal band, resulting in incomplete transmission. If the transmission band is substantially greater than the signal band, then there would be unutilized frequency space and the data throughput rate would not be maximized.

Regarding claim 2, claim 2 is an apparatus claim that introduces limitations that correspond to the limitations introduced by apparatus claim 1. Therefore, the recited means in apparatus claim 2 read on the corresponding means in apparatus claim 1.

Regarding claim 3, Qian discloses:

The optical receiver according to claim 2, wherein said wavelength division multiplexing signals further comprises first signal light with transmission bandwidth F1 and second signal lights with transmission bandwidth F2 (e.g., Fig. 10B), which are arrayed alternately (e.g., Fig. 10B), and

said demultiplexing unit is provided with an interleaver (e.g., OSS in Fig. 10A) comprising:

an input port for inputting said first wavelength division multiplexing signals (e.g., 1002 in Fig. 10A);

a first output port having a transmission band which substantially matches the signal band of said first signal light (e.g., 1004 in Fig. 10A in view of the "substantially matches" argument presented in the treatment of claim 1 above); and

a second output port having a transmission band which substantially matches with the signal band of said second signal light (e.g., 1006 in Fig. 10A in view of the "substantially matches" argument presented in the treatment of claim 1 above).

Qian does not expressly disclose:

said first signal and said second signal lights are arrayed alternately ***with the frequency interval F (F ≥ (F1+F2)/2)***.

However, such an interval is a common interval in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to provide this interval in the apparatus of Qian. One of ordinary skill in the art would have been motivated to do this since it is the minimum interval between the center wavelengths of two channels so that the bandwidths of the two channels do not overlap and interfere with each other. That is, the bandwidth of a channel occupies a certain region of frequency space. The center of this bandwidth is the center wavelength of that optical channel. When multiple channels are transmitted together, one should place the respective frequency bands of the channels so that they do not overlap in frequency space. Otherwise, they would interfere with each other and result in erroneous transmission of the interfering channels. Accordingly, there is a minimum frequency interval between the center wavelengths of the channels so that the channels do not overlap and interfere. Since half the bandwidth of a channel resides on one side of its center wavelength, F1/2, the center wavelength of this first channel must be at least F1/2 away from the edge of the frequency band of an adjacent second channel. Accordingly, since half the bandwidth of this second channel resides on this side of its center wavelength adjacent to the first channel, the center wavelength of the second channel must be at least F2/2 away from the edge of the frequency band of the adjacent first channel. Summed together, the center wavelengths of the adjacent channels must be at least F1/2 + F2/2 away from each other to avoid overlapping bandwidths and channel interference. For example, if one channel has a bandwidth of 50 GHz and another channel has a bandwidth of 100 GHz, then the center wavelengths of these channels would have to be at least 75 GHz ((100+50)/2) apart to avoid overlapping bandwidths.

Regarding claim 18, claim 18 is an apparatus claim that introduces limitations that correspond to the limitations introduced by apparatus claim 1. Therefore, the recited means in apparatus claim 18 read on the corresponding means in apparatus claim 1.

Allowable Subject Matter

8. **Claims 19-21** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wang et al. (U.S. Patent No. 6,545,782 B1) is cited to show an asymmetric wavelength channel slicing device such that the bandwidth of channels in one arm is different from that of the other to allow different maximum bit-rate to be transmitted in different wavelengths.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Kim whose telephone number is 571-272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSK

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER